



US Army Corps
of Engineers
North Pacific Division

Salmon Passage Notes

Snake and Columbia River Fish Programs

April 1992

DRAWDOWN '92

A Need for Action

Although dams on the Columbia and Snake rivers have provided many benefits to the region--power, navigation, irrigation, recreation--they have had negative effects, particularly on salmon that must pass the dams to and from the ocean. To enable salmon to get past the dams, adult fish passage facilities were constructed in each of the eight mainstem lower Snake and Columbia river dams, and improved juvenile fish bypass facilities will be complete in all of them by 1998 (six of the eight will be operational in 1992). However, the reservoirs created by the dams

Snake River stocks of sockeye salmon were listed as endangered and spring/summer and fall chinook are proposed for protection under the Endangered Species Act.

Salmon Summit

In 1990 a regional team, comprised of State and Federal fish agencies, river system operating agencies, environmental groups and river users, was formed to develop a recovery plan for salmon stocks. The team met for several months--the so-called "Salmon Summit"--but were unable to reach consensus on a comprehensive plan. However,

many ideas for additional measures to improve conditions through modification of the hydrosystem were suggested. Evaluation, and, in some cases, implementation of these concepts has been an ongoing process.

Drawdown Concept Proposed

The concept of drafting lower Snake River reservoirs to elevations at which water flows freely over the spillways--some 30-40 feet

below normal operating ranges--was proposed at the Salmon Summit to assist juvenile salmonids in their downstream migration.

Responding to regional resolve, the Corps of Engineers, in cooperation with Bonneville Power Administration and the Bureau of Reclamation, developed potential alternatives for a test of the drawdown concept. These alternatives were addressed in the 1992 Columbia River Salmon Flow Measures Options Analysis/Environmental Impact Statement.

Implementation

On February 14, 1992, a decision to conduct a drawdown test of Lower Granite and Little Goose reservoirs was made by Maj. Gen Ernest J. Harrell, at the Corps' North Pacific Division office in Portland. The purpose of the test was to gather data on reservoir drawdown to near spillway crest for potential use in developing long-term reservoir drawdown operations criteria.

The test was conducted from March 1 through March 31--a period when few migrating fish were present in the test area. Lower Granite was drafted to 696 feet elevation--37 feet below its minimum operating elevation of 733 feet. Little Goose reached its lowest level at elevation 620.5 feet--12.5 feet below its minimum operating level of 633 feet.

During the test a number of state and federal agencies worked with the Corps to collect information on physical, environmental and structural effects.

What did we find out?

At this writing, the Corps and involved agency teams are still analyzing the data collected in the 31-day test. A full report of findings is due in June of this year. For the next issue of Salmon Passage Notes, we should have some preliminary findings.

We do know that during spill conditions, dissolved gas levels increase significantly above normal. These conditions can be harmful or even lethal to fish. We also found that as the reservoir was drawn down, the power output and efficiency of the turbines and generators decreased. But the good news is that operating the turbines at low levels does not appear to cause damage or undue wear.

Though no major structural or environmental problems were encountered, the month-long test that dropped reservoir levels some 37 feet halted commercial barge traffic used to export wheat and other commodities, damaged floating docks, marooned a swimming beach and several recreation areas, dried out a golf course, cracked a county road and killed unknown quantities of fresh water mussels, clams, and resident fish.

A great deal of data and understanding of physical effects of drawdown were gained by the test. One finding that became clearly evident is simply just how complex, costly and controversial the concept.



Flows at 100,000 cubic feet per second surge through the spillway at Lower Granite Dam to test physical and structural effects of spilling during drawdown conditions. Also, dissolved gas levels were monitored before, during and after spill tests.

pose additional problems. Water velocities through the reservoirs are much slower than natural river flows in pre-dam times.

Early in this century, an estimated 8 to 16 million salmon and steelhead returned to the Columbia and Snake rivers to spawn. Today's runs are estimated at approximately 20 percent of the original runs--the majority of which are hatchery fish. These declines are a result of many aspects of development in the region including the dams, but also irrigation, commercial and recreational fishing, logging, grazing, agriculture, water pollution and other effects of modern man on the environment. In December 1991,

System Configuration Studies

In the last **Salmon Passage Notes** we promised to give you details of a major Corps of Engineers initiative to explore long-term structural modifications to Federal hydropower projects to improve survival of Snake and Columbia river salmon runs.

This is the System Configuration Study--or if you'd like to learn a new acronym--SCS. This is a two-phase study which will examine long-term modifications that can be made to dams on the lower Snake and Columbia rivers as well as possible addition of new "fish flow" storage dams and other structural measures that have the potential of improving the survival of Columbia and Snake river salmon stocks.

■ What is it?

The SCS is an element of the Columbia River Salmon Mitigation Analysis initiated by the Corps to address the need for mitigation of adverse impacts of the eight mainstem dams on anadromous fish runs.

SCS is separate but related to the Columbia River System Operation Review (SOR) in which potential changes to the **operation** of the Federal projects are being studied jointly by the Corps of Engineers, the Bonneville Power Administration and the Bureau of Reclamation. Many of the potential operational changes would require **configuration** or **structural** changes to the system including modification of existing projects and new construction. These changes will be addressed in the SCS.

■ The Alternatives

Alternatives to be analyzed include those recommended in the Northwest Power Planning Council's Fish and Wildlife Program (Phase Two) issued in December 1991. Other alternatives to be analyzed include some identified during the Salmon Summit and regional input that followed.

The study will analyze the following five categories of alternative long-term actions.

(1) **Existing system improvements.** The SCS will define and evaluate potential improvements to existing facilities which would improve passage and survival of both adult and juvenile fish. Potential improvements for juvenile facilities include how fish are released at bypass facilities, extending the length of diversion screens at the turbine intakes, replacing flume systems that take the fish from the bypass systems to the collection facilities, and modifications to loading and transport facilities and equipment.

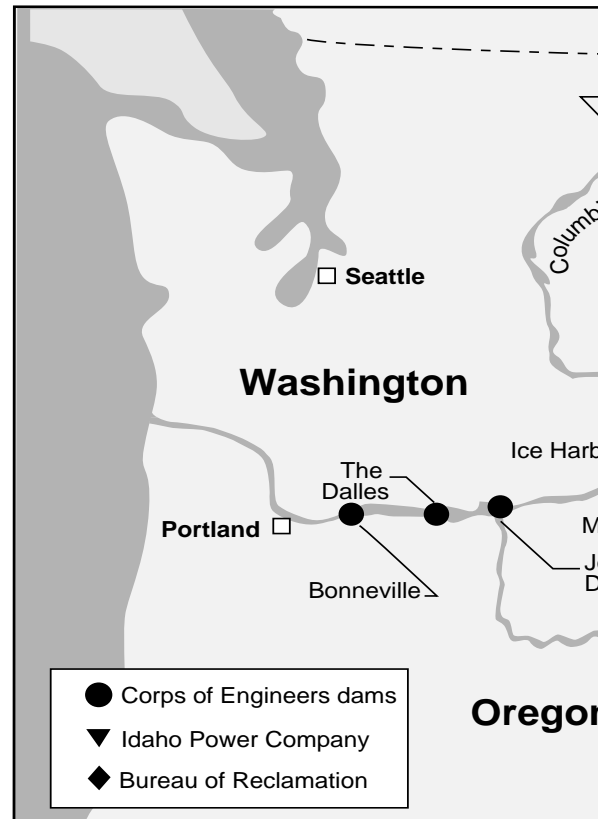
Potential adult facility improvements include water temperature reduction in fish ladders, installation of additional ladders and additional attraction water.

At fish hatcheries, the addition of tanker truck loading facilities and additional raceways or

other containment facilities to reduce fish densities will be evaluated.

Improvements already scheduled for implementation, such as ongoing work to install or improve efficiency of fish screens and bypass systems at the dams will not be affected by the SCS.

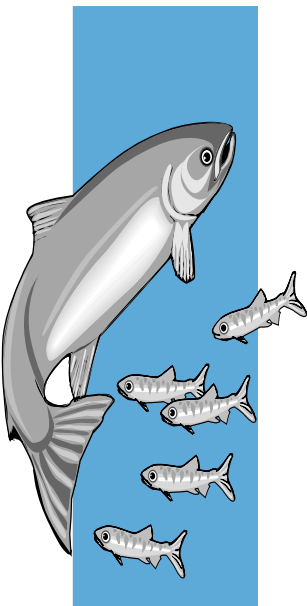
(2) **Additional upstream storage.** The SCS will examine the possibility of providing additional upstream storage for flow and temperature modifications during fish migration periods. The SCS will develop information on site locations, storage, possible flows, type of structures,



preliminary design and costs and estimated schedules for implementation. In addition, benefits to juvenile fish passage will be provided.

The Bureau of Reclamation is facilitating an interagency effort to inventory and screen potential storage sites for further study. One such site for which there is strong interest by the state of Idaho is the Galloway site on the Weiser River.

(3) **Lower Snake Projects and John Day Reservoir Drawdown.** Annual lowering of pool levels at the four lower Snake projects is under consideration (please see related story in this issue). An array of modifications to powerhouses, spillways and other project features which would allow the projects to operate under a range of drawdown conditions while maintaining safe and effective juvenile and adult fish passage will



be evaluated by the SCS.

The impacts on existing project uses under these conditions will be assessed and measures to mitigate impacts will be evaluated. These primary uses include navigation, irrigation, hydropower generation, recreation, and municipal and industrial water supply. Modifications that may be required to protect structures, levees, railroads, highways and drainage systems during drawdown will also be examined.

Annual operation of the John Day project at minimum operating pool (elevation 257 feet) during the juvenile migration period will also be



evaluated. The study will identify measures necessary to mitigate impacts to irrigation and other water supply systems, navigation, fish and wildlife, cultural resources, recreation, Indian in-lieu fishing sites, and fish passage facilities. Alternative measures to mitigate impacts on water users, such as irrigation canals along both banks of the river and modification and relocation of existing pumping stations, will be examined.

(4) **Upstream Collector.** This alternative consists of a new collection facility (or facilities) near the upstream end of Lower Granite reservoir for collection of juvenile fish and diverting them to a barge or stream channel/pipeline for movement to below Ice Harbor dam or continue on to below Bonneville Dam. Collection concepts identified so far include one or more facilities upstream of

Lower Granite near Lewiston, Idaho and Clarkston, Washington, or utilizing the existing dam as the collection point for juveniles and the diversion point for water.

(5) **Transport.** Transport options from a new upstream collector or Lower Granite Dam include an open canal along the river shoreline, a floating or underwater pressurized pipeline, and barge transport from the collection facility. The use of net pens instead of barges to move fish downstream will also be evaluated.

The concept of constructing a migratory canal into which fish could be diverted for travel past the dams surfaced at the Salmon Summit. The SCS will identify preliminary canal routes and designs as well as provide preliminary cost estimates.

■ Schedule

An interim report on the SCS is scheduled to be submitted to the Council by November 1992. The Council has requested a report containing a detailed analysis of viable alternatives identified in interim report by November 1993.

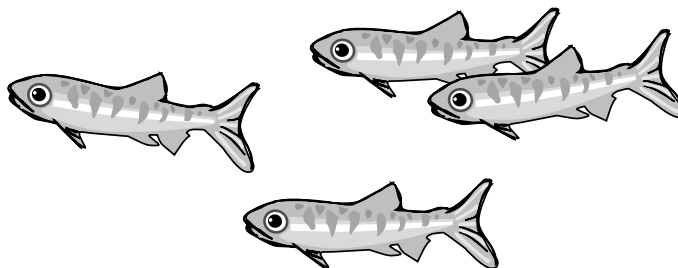
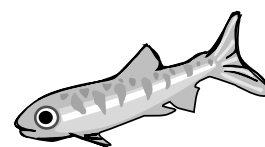
■ Districts Conducting Study

Elements of the study have been assigned to the Corps district offices at Portland, Seattle and Walla Walla. Involvement of the public in the formulation, analysis, and review of the elements of the SCS will be sought through various means--including public information meetings and direct mailings. Please see related item on last page.

■ Oversight

SCS drawdown alternatives will be monitored and overseen by the Columbia-Snake Drawdown Committee which is chaired by the Northwest Power Planning Council, and consists of representatives from the Bonneville Power Administration, the Bureau of Reclamation, the Corps of Engineers, the states of Idaho, Montana, Oregon and Washington, and the Indian tribes.

Seeking public involvement



All Systems Go For Fish Transport

With completion of the Snake River Drawdown Test April 1st, fish bypass and transportation systems at Lower Granite and Little Goose dams were activated and collection of juvenile salmon arriving at the dams commenced.

This flow year is expected to be similar to, or even a little drier than 1991. As a result, the National Marine Fisheries Service, along with other regional fishery agencies, are again calling for truck and barge transport of as many migrating juveniles as can be collected.

Should river flows exceed 100,000 cubic feet per second (cfs) at Little Goose or 220,000 cfs at McNary, the smaller juvenile migrants such as chinook salmon would be bypassed to the river. Larger smolts such as steelhead would still be collected and transported. Currently inflow at Little Goose is averaging 30,000 cfs and 100,000 at McNary.

To effect increased survival, the transport season may again be extended through the end of October at Lower Granite and Little Goose and through the end of December at McNary. Normally the transport season is terminated on the Snake River by the end of July and at McNary on the Columbia River by the end of August because of the small numbers of fish.

Even though the numbers are expected to be small, considering that some may be threatened chinook or listed sockeye salmon, helping only a few to avoid the perils of the journey to the sea justifies the added effort. Three new pickup-mounted tanks will be used for transporting small numbers of fish as needed.

Research efforts this year include releasing a few controlled

barge loads of juveniles off Tongue Point--about four miles upstream of Astoria and 18 miles from the mouth of the Columbia River. The usual release destination is off the Skamania Light House--seven to eight miles downstream of Bonneville Dam and about 150 miles from the ocean. The research is aimed at determining if it may be advantageous to release fish nearer the ocean.

Public Information Meetings

The Corps is planning to hold informational public meetings in the near future to discuss the March test drawdown of the Lower Granite and Little Goose projects, and to outline the scope of work for the System Configuration Study described in this newsletter. The public will be notified of these meetings through mailings and newspaper notices. Information may also be obtained by calling Adele Merchant in the North Pacific Division of the Corps (Portland), at (503) 326-3417.

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